Seabeach Amaranth Resurfaces

A threatened plant, *Amaranthus pumilus*, has been making a comeback along East Coast shorelines for the past 10 years. On the roster of threatened species, it grows closer to the ocean than other plants, where it competes with commercial beach development. Seabeach amaranth is of special interest to agriculture because it has atypically large seeds for the genus and could perhaps be the source of crop-improving genes for cultivated amaranths. Consumers in many countries enjoy amaranths as both a leafy vegetable and as a kind of cereal. The foliage is an extremely good source of bioavailable iron—more than spinach—and the seeds contain a rare, high-quality plant protein that can be used to enrich grain products.

Seeds of six distinct, large-seeded *A. pumilus* populations were collected and tested to see what regeneration methods work best. Keeping the seeds for 3 months in cool, moist surroundings led to 90 percent germination. The samples are being conserved as part of a comprehensive collection of amaranth germplasm maintained in the National Plant Germplasm System. *David M. Brenner, North Central Regional Plant Introduction Station, Ames, Iowa; phone (515) 294-6786, e-mail dbrenner@idstate.edu.*

Can Kenaf Feed Livestock?

First cousin to the hibiscus and a relative of cotton and okra, kenaf grows well in many parts of the United States. Favored as a fiber crop in other countries, it's been extensively tested here as a source of pulp for papermaking. But scientists have wondered if it could also be used as animal feed.

The most commonly grown U.S. hay crop—alfalfa—is a perennial legume used in high-concentrate diets fed to lambs and cattle to provide protein and dietary fiber. But to grow it, farmers must make a multiyear commitment of land and resources that isn't always optimal for some integrated cropping-and-livestock enterprises. So researchers wondered if unconventional annual crops like kenaf would give producers more flexibility. Feeding tests with 53 spring-born lambs have recently bolstered the theory. Data showed that kenaf hay could replace alfalfa hay in lambs' finishing diets without significantly affecting feed intake or performance. *William A. Phillips, Grazinglands Research Laboratory, El Reno, Oklahoma; phone (405) 262-5291, e-mail bphillip@grl.ars.usda.gov.*

Repellent Curbs Virus Carriers

Few effective repellents have been developed to keep mosquitoes from biting—and possibly transmitting serious diseases. Now, scientists are seeking a patent on a method for selecting the most effective version of a repellent that was discovered more than 20 years ago. It is based on piperidine—a hexagon-shaped molecule found in trace amounts in black pepper. Two other chemical groups are attached to this hexagon, but each can attach at two different angles, resulting in four different versions, or optical isomers. One of these has been found to be three to four times more effective than the original repellent at preventing yellow-fever-transmitting mosquitoes from biting. It's also the most effective against the species that transmits West Nile virus.

Other chemical groups can attach to the piperidine scaffold at various locations and angles to create dozens of new candidates for testing. Early reports are that piperidine-based repellents are easily formulated into creams, and—unlike DEET—they don't dissolve plastics. But although the original piperidine-based products underwent toxicological testing, new products for commercial sale will require more testing by the U.S. Environmental Protection Agency. A patent is being sought, and interested companies will have an opportunity to license the new method for selecting optimal piperidine-based isomers. *Jerome A. Klun, USDA-ARS Chemicals Affecting Insect Behavior Laboratory, Beltsville, Maryland; phone (301) 504-9388, e-mail klunj@ba.ars.usda.gov.*

Phytomining Cleans Soil, Generates Revenue

Studies have now shown that using certain plants to extract metals from soil is commercially feasible. These specially selected plants—called hyperaccumulators—are known for their ability to take up and store particular metals. Now a team of scientists has developed a nickel hyperaccumulator plant for commercial use. After evaluating several hundred strains of *Alyssum* plants for favorable genetic characteristics, they have developed the first commercial crop capable of hyperaccumulating nickel and cobalt. This haylike crop would be burned after harvest to create a biomass energy byproduct, with nickel and cobalt recovered from the ash.

This approach to cleansing contaminated soils is a win-win strategy because using it doesn't cost much and the recovered nickel is valuable. While establishing a low-grade pasture or woodlot on contaminated land or nickel-rich serpentine soils might yield about $50 to $100 per hectare annually, producing the nickel phytomining crop could yield about 400 kilograms of nickel, worth over $2,000. If you count the sale of energy produced by burning the plant to get the metal-rich ash, the value rises to more than $2,500 netted from that same hectare. And the plants can extract nickel from mining wastes and mineralized soils for which conventional mining techniques are not economic. Viridian LLC, of Houston, Texas, who cooperated in developing this technology and has licensed the patents, is offering contracts to landowners to phytomine Oregon and California soils for nickel and cobalt in 2002. *Rufus L. Chaney, USDA-ARS Animal Manure and Byproducts Laboratory, Beltsville, Maryland; phone (301) 504-8324, e-mail chaneyr@ba.ars.usda.gov.*